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VIRTUAL ENTERPRISE: PROPOSITION OF A TYPOLOGY

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Abstract

New Information Technology (NIT) is now so well-used that most organizations can not disregard it. Isolated areas of the planet can be served by information superhighways. This world is perceived as having no more frontiers and turns out to allow new forms of organizations like the virtual enterprise. Some previous researches proposed several representations of virtual enterprise forms. An analyze of this new concept in Management Science allow us to depict two main characteristics: the NIT impact on organization and the degree of cooperation between firm partners. According to both dimensions, the aim of this article is to propose, instead of an other model, a typology of the virtual enterprise concept.

Key words :

Virtual enterprise, New Information Technology, Typology, Cooperation, Intensity of use

Résumé

Les Nouvelles Technologies de l'Information et de la Communication sont maintenant tellement diffusées que la plupart des organisations ne peuvent plus se permettre de les occulter de leur vision stratégique. Les zones géographiques retirées de la planète peuvent désormais être desservies par les autoroutes de l'information. Ce monde perçue comme n'ayant plus de frontières fait émerger de nouvelles formes d'organisations comme l'entreprise virtuelle. Les recherches antérieures ont proposé des représentations de différentes formes possibles d'entreprises virtuelles. L'analyse des caractéristiques de ce concept émergent en Sciences de Gestion permet d'isoler deux caractéristiques principales : le niveau d'utilisation des NTIC et le degré de coopération entre les partenaires. L'objectif de cet article est de proposer, plutôt qu'un nouveau modèle, une typologie à partir de ces deux dimensions.

Mots clés

Entreprise virtuelle, Nouvelles Technologies de l'Information et de la Communication, Typologie, Coopération, Intensité d'utilisation

Introduction

New Information Technology (NIT) is now so well-used that most organizations can not disregard it. Lot of researches have been done about its effectiveness. Most failed in their demonstration of the link with firm performance. However, NIT turns out to be a new standard of communication. So is it really relevant to analyze the efficiency of such tools, knowing that they can not be got away anyway? Even if NIT does not create competitive advantage, its lack of use may involve competitive disadvantage. As the use of telephone or fax appears like an evidence, we prefer concentrating our attention on new ways of doing business with NIT than on its legitimacy.

Isolated areas of the planet can be served by "information superhighways". The "traffic" is so high that a real "parallel world" appears. This world is perceived as having no more frontiers (Hirschhorn & Gilmore, 1992), and within which new forms of organizations emerge like the virtual enterprise.

This concept fits for this "New World". It can be defined as a community of several remote organizations coordinated with NIT. According to this idea, real meetings between partners disappear for all practical purposes (Drexler & Sibbet, 1988; Bleeker, 1994; Hofstede & al, 1997; Kiosur, 1997) and coordination is remotely done: a sort of "telecoordination" (Meissonier, 1998).

As for us, the notion of virtuallity refers to boundaries that are fuzzier than in the past as a consequence (Hirschhorn & Gilmore, 1992 ; Amabile & Avenier, 1997). For instance, how Benetton entity should be considered? How foreign subcontractors, carrying out the whole production, have to be viewed? As part of the firm? As external actors? May outlets spread all around the world

- providing by EDI sale information in real time - be simply considered as independant resellers? When all is said and done, is Benetton just an intermediary or a real textile network?

If Benetton may be represented as a form of virtual organization, other exist. So, constructing a typology seems to be an interesting job.

A recent research on this subject has been done by Janice Burn in 1998[1] who identified six forms (the Virtual Faces model, the Co-alliance model, the Star-alliance model, the Value-alliance model, the Market-alliance model and the Virtual broker model). The aim of this paper is to pursue this area of research.

Firstly, we are analyzing cooperation systems of firm networks. Secondly, the influence of New Information Technology on the arising of these new forms of organizations is going to be depicted. From these two perspectives, both dimensions may be distinguished in order to built a typology of Virtual Organizations.

First dimension: the level of cooperation between firms

From an economic standpoint, virtual organization wavers between hierarchical and market-like system (Gebauer, 1996). Hierarchical system is characterized by stable relationships between members reflecting a core surrounded by satellite organizations. Market-like relationships are more dynamic and are regulated by economic power (Williamson, 1975; Thorelli, 1986). Interests of members are more short-term oriented, and the network is very changing.

[1] BURN, Janice M., "Aligning the On-line Organization – with What, How and Why", *proceedings of 8th Annual BIT Conference*, 1998

As it will be shown in the second part, the network can establish its durability by itself: it is a temporary network. Relationships may be also dynamic in a more durable activity. In that case, contracts are signed just to take advantage of opportune moments: with cheapest or best providers of the season. Less changing relationships are more based on wills of cooperation between members. In the literature, the stability is a well-used variable to represent network forms[2]. So, in this part, we propose to take over this dimension for our typology.

What is cooperation?

Cooperation has been amalgamated for a long time with collusion. Indeed, the idea of cooperation between firms shocked because it was considered, in compliance with capitalism theory, as contrary to the actor independence postulate (Kœnig, 1996). Nevertheless, the aim of the agreement is different in both cases…

Collusion is an agreement between enterprises on key variables of the market: prices, quantities, and so on. Conversely, cooperation refers to coordination processes of a common project like logistic, shared resources, etc. While collusion tries to influence exchange conditions, cooperation looks for a reinforcement of resources, competencies and synergies between enterprises of different activity sectors.

Beyond a business warlike vision, cooperation perspective changes relationships from fighting-like status to "coopetition": (Millot, 1995 ; Kœnig, 1996 ; Nalebuff & Branderburger, 1996). The legitimacy of this system is justified if even each firm member is not the best one of the network, it is protected against economical and strategic risks that could be worse if it was a "free rider".

[2] For more information about this point, see Thorelli (1986)

Why cooperate?

Cooperation is a way to achieve together what isolated firms could not do: resources sharing (Adler, 1979), access to foreign markets, product and technology developments (Hamel, Doz & Prahalad, 1989), etc. So, cooperation is a sort of collaboration between enterprises coordinating their complementary competencies along the value chain (Baudry, 1995)

Despite these well-known stakes, cooperation permits managers to combine their point of views and to obtain insights collectively (Lacoste, 1992). Indeed, faced with environmental complexity, human rationality turns out to be insufficient to pretend to access to the optimal solution. In compliance with their bounded rationality actors have to settle for “satisficing solutions” (Simon, 1947; Arrow, 1974; March & Simon, 1960; Le Moigne, 1990). Indeed, each actor has limited cognitive capabilities, and limited treatment capabilities. Since Feldman & March (1991) showed that most of information collected in organizations is not really used, has no report with choices made, the link between information and decision is no more trivial (Le Moigne, 1990).

The information quantity does not reduce the incertitude because the actor risks to be asphyxiated under a huge mass dilapidating his discernment (Ackoff, 1967 ; Machlup, 1984 ; Feldman & March, 1991 ; Sfez, 1994 ; Lesca, 1995 ; Amabile, 1997). So, in organizations, the real problem seems to be more relative to the sensitivity to environmental signs than to obtain information itself. As a consequence, persons tend to balance their own weaknesses by sharing information with others in order to obtain a mutual compensation (Godet, 1989 ; Kervern, 1994). So, a cooperation system is a way to bypass our limited rationality and to head for a “reticulated rationality”.

But, as a voluntary strategy between autonomous actors, cooperation must be assorted of a sufficient motivation. And it is perhaps the main difficulty

that organizations have while working with different partners of a complex network (Crozier, 1989). Despite material resources, projects and common objectives, what do organizations have to share to favor the cooperation timelessness?

Trust: a key condition for cooperation

We can easily understand that trust is a key condition of horizontal cooperation effectiveness within each partner represents also a rival (Puthod, 1995). But this feeling is as much necessary within vertical cooperation since financial risks are engaged (Chesbrough & Teece, 1996). Some authors like Arrow (1976) consider trust as an essential “lubricating” of the “organizational wheels”. Others (Kœnig, 1992; Puthod, 1995) prefer stating that it is a deciding asset for the continuation of the cooperation.

In virtual organization, some fears between partners might more rise easily (Handy, 1996). There, it is still more relevant because most contacts are remotely done: anonymous and “invisible” actors have to work together. Really making someone's acquaintance at a distance is difficult. As a paradox, the more virtual an organization is, the more real encounters between partners are necessary to develop feelings and trust (Perlo & Hills, 1998). The wider the geographic scope is, the more cultural differences between partners may appear and the more real encounters are necessary (Handy, 1996; Perlo & Hills, 1998). So, dehumanization of relationships is one of the limits of remote coordination system.

Trust does not appear easily because it is likely to be based more on emotional than rational criteria. Despite the stake of maintaining some real encounters between partners to take care of partners' trust, a real fair game has to be respected between partners. Indeed, trust influences the dynamic and the rhythm of organizational learning (Ingham, 1994), and it is linked with

information exchanges (Kœnig, 1992). So, in network organization a real symmetry of information and knowledge exchanges is necessary to respect the feeling of equity.

Of course, the factors that we developed in this part are non exhaustive but are significant in the duration of relationships in cooperative systems.

Second dimension: New Information Technology use

The specific characteristic which distinguishes virtual enterprise from "classical" network is the use of NIT. Indeed, virtual enterprise tries to get round time and space constraints by having a moving geographical scope outlined by data computerized links… Without NIT there's no virtual enterprise…

What is NIT?

NIT encloses all data computerized treatment and communication systems: Internet, Intranet, e-mail, Groupware, Workflow, etc. (Orlikowski & Gash). According to Scott Morton (1995), technical components which should be taken into account are the following:

- ✓ computers: from PC to mainframes,
- ✓ software: from e-mail applications to GDSS
- ✓ data networks,
- ✓ specific working stations: high calculators, simulators, etc.,
- ✓ robotics: from automated production systems to ticket-machines,
- ✓ "intelligent chip" included in products in order to increase their functionality or their reliability.

By enabling communication, storage and treatment of data, those technical systems allow a remote achievement of coordination processes (by e-

mail or GDSS for instance) or, of production processes themselves (ticket machines for example).

Why using NIT?

NIT may be viewed as a catalyst to the setting-up of collaborations or partnerships between enterprises geographically dispersed. NIT allows firms to develop projects more easily with foreign partners in order to access markets, to take advantage of local resources, or to share competencies and knowledge (Ettighoffer, 1992; Byrne, 1993).

Moreover, by searching to get round time and space constraints, organizational advantages can be expected. The network is likely to gain flexibility (Miller, Clemons & Row, 1993; Upton & McAffee, 1996). With its "virtual links", a new configuration more adapted to the activity evolution, can be quickly set up. Data processing systems may also help to improve interorganizational processes like with Just-In-Time transactions (Davidow & Malone, 1992).

Finally products and services can be directly delivered to consumers with e-commerce applications for instance. Despite transport and time saving, NIT may involve direct business to business, a downsizing in intermediaries and a reducing cost of distribution channels.

Up to what level?

As a consequence of its implantation and utilization, NIT has different levels of impact on organizations:

- ✓ simply local use,
- ✓ internal integration,
- ✓ redesign of processes,
- ✓ redesign of links with partners,

- ✓ and finally, redesign of the firm goals (Venkatraman, 1995).

We could transpose the two last ones to the virtual enterprise concept. At a first level, NIT may be used just as additional tool to coordinate the network. EDI, Workflow, Groupware are systems that permit information exchanges in order to facilitate intra and interorganizational processes.

But, at a higher level (that could be a sixth in Venkatraman's model) of diffusion, NIT may be perceived by external actors as the only way to communicate with the enterprise (see some business web servers, forums for instance). The activity is transformed into a "cyberspace" because of its predominance along the value chain. The identity of the firm itself is therefore perceived as immaterial, and its physical location doesn't really matter for the customer purchases.

Proposition of a typology

With reference to our two dimensions, we propose the following matrix as a possible representation of different virtual enterprise forms. Each cell corresponds to a "virtual network case" according to its stability and its NIT diffusion level.

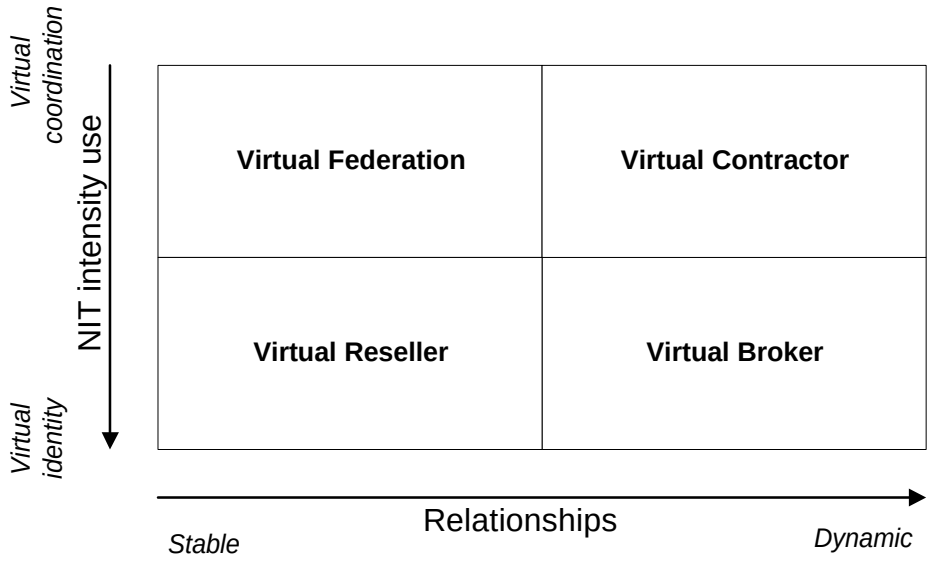
As illustrations, we use some of the examples already presented by Janice Burn (1998). Indeed, certain characteristics may be similar to ours.

- ➪ Virtual federation is a stable network of firms remotely coordinated with NIT by a central unit. Most of virtual enterprises based on this form correspond to a federal firm concentrated on its core competency and that outsources support functions. In order to maintain its activity duration, satellite units are true partners.

- Virtual reseller is the same sort of network, but its activity exists in the cyberspace. The virtual library, Amazon.com, the software provider, Beyond.com are instances. In this form of virtual enterprise, NIT is so important in the value chain that, without it, products and services could not be proposed. The physical location and identity of the enterprise does not really matter to customers.

- Virtual contractor is a temporary network com posed in order to achieve a specific activity. An example is the textile industry in Italy (Quinn, 1993). Faced with the fashion dynamism, a network of specialized SMEs is redesigned every season. At the end of a period, the network is dissolved and recomposed differently the next time in function of the new product characteristics. NIT helps SMEs to contract and coordinate their activity rapidly.

- Virtual broker is defined as a designer of dynamic networks (Miles & Snow, 1986). According to Burn, “These prescribe additional strategic opportunities either as third party value added suppliers such as in the case of common web marketing events (e-Xmas).” Networks formed in this sort of business web meeting are therefore temporary and very flexible.



Conclusion

Of course, this typology does not pretend to be exhaustive. Due to the raise of communication channels, several representations of new forms of organization could be done. However, if a lot of network typologies already exists, it was interesting to construct one for this exacerbated reticular form that is the virtual enterprise.

Numerous studies on possible advantages of NIT had been done. In addition to those reminded in the paper, others concern more political aspects. About country planning, some governmental projects try to take advantage of telework. For example, in France, incentives for the development of teleservice offices in rural regions aim to avoid depopulation[3]. At a wider scope, NIT allows virtual organizations to establish links with developing countries more easily, in order to enhance local resources. So, a better diffusion of NIT could also be the take-off point of better nation implications of in worldwide economy.

[3] For more information about this point, see French DATAR reports

But, virtual organization also requires radical new approaches in management: worker and job evaluation of, coordination organization, employee training, etc. (Davenport & Pearlson, 1998). A coordination entirely remotely done may dehumanize relationships and establish "virtual barriers" between partners.

So, virtual enterprise encloses advantages and drawbacks varying between the forms that we presented in this paper. This could be the topic of future studies on this organizational concept that should not be seen as "the organizational form of XXI century", but only as a new one.

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